

Organosilanes

Organosilanes are widely used in organic chemistry, particularly as protecting groups^{1,2}, derivatisation reagents³, reducing agents⁴ and synthetic intermediates. The Acros Organics portfolio of organosilanes is continuously expanding to meet your chemistry needs. On the reverse side you will find information on some of the products introduced recently. This newsletter is derived from a more thorough review of Organosilane chemistry to be published later in 2011.

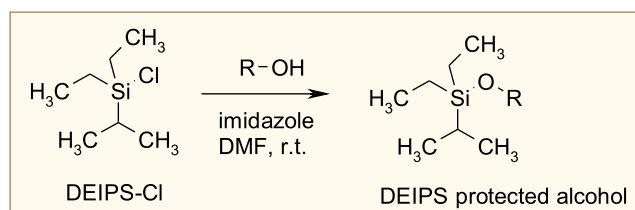
SILICON PROTECTING GROUPS

Silylating agents are mostly used to protect alcohols and phenols, but have also found application in the protection of amines, carboxylic acids, amides, thiols and alkynes. The actual stability of a silyl protecting group depends on the pH of the medium, the exact reaction conditions, steric and electronic effects, but in general terms the stability to hydrolysis increases:

Acidic hydrolysis: TMS < TES < TBDMS < TIPS < TBDPS

Basic hydrolysis: TMS < TES < TBDMS ~ TBDPS < TIPS

For example, DEIPS-Cl [43565] has been newly introduced as a silyl protecting agent for alcohols. It is more labile to acid and base hydrolysis than TBDMS, but is 90 times more stable than TMS to acid hydrolysis and 600 times more stable to base hydrolysis⁵.

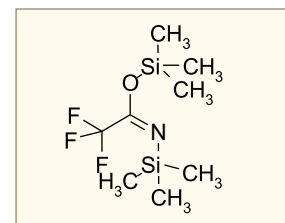


[43565]

DERIVATIZATION

Derivatization of a compound by reaction with a silylating agent is of particular use in gas chromatography (GC) analysis. Molecules containing functional groups such as carboxylic acid, hydroxyl, amine, thiol and phosphate, which may be difficult to analyse by GC, can be readily converted into silylated derivatives which are generally less polar, more volatile and have greater thermal stability and are therefore more suitable for GC analysis.

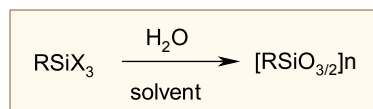
N,O-Bis(trimethylsilyl)trifluoroacetamide⁶, (BSTFA) [38932] is a powerful analytical silylation reagent. The by-products and the reagent itself are highly volatile so cause minimal interference with the GC analysis.



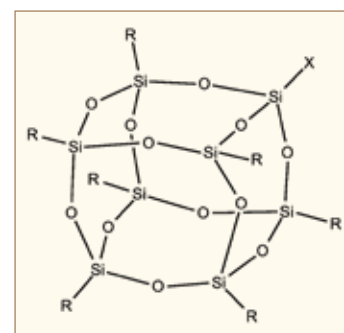
[38932]

SYNTHETIC INTERMEDIATES

There is a growing need for organosilanes in the field of silicon containing organic polymers, whose potential applications include electronic and optical materials, catalysts and coatings.⁷ Hydrolytic condensation of trifunctional silanes yields silsesquioxanes, where each silicon atom is bound to an average of one and a half oxygen atoms and to one hydrocarbon group. Among various types of silsesquioxanes, polyhedral oligomeric silsesquioxane (POSSTM) reagents offer a unique opportunity for preparing hybrid organic-inorganic materials with the inorganic structural units truly molecularly dispersed within the nanocomposites.



Acros Organics have increased their range of trichlorosilanes which are useful precursors to silsesquioxanes, with examples such as [43224], [27711], [14741] & [43560].



Silsesquioxane Cage

- 1 T. Greene, P. G. M. Wuts; "Protecting Groups in Organic Synthesis"; 2nd Ed., Wiley, New York, 1991
- 2 P. J. Kocienski; "Protecting Groups"; 3rd Ed., Thieme: Stuttgart, 1994
- 3 K. Blau, J. Halket; "Handbook of Derivatives for Chromatography", 2nd Ed., J. Wiley and Sons, New York, 1993.
- 4 C. Chatgililoglu; "Organosilanes as radical-based reducing agents in synthesis"; Acc. Chem. Res., 1992, 25, 188
- 5 D. T. Hung, J. B. Nerenberg, S.L. Schreiber; J. Am. Chem. Soc., 1996, 118, 11054
- 6 D. L. Stalling et al., Biochem. Biophys. Res. Commun. 1968, 31, 616
- 7 C. Hartmann-Thompson (Ed.); "Applications of Polyhedral Oligomeric Silsesquioxanes" - Advances in Silicon Science, Vol. 3; 1st Ed., 2011

A SELECTION OF NEW ORGANOSILANES FROM THE ACROS ORGANICS RANGE

Product Code	Product Name	CASNo	MDL Number	Purity
14741	N-Propyltrichlorosilane	141-57-1	MFC000013603	98%
21593	Dimethylphenylsilane	766-77-8	MFC000008257	98%
27711	3-Cyanopropyltrichlorosilane	1071-27-8	MFC000013832	97%
31332	(Bromomethyl)dimethylchlorosilane	16532-02-8	MFC000000503	95%
31337	Dichloro(chloromethyl)methylsilane	1558-33-4	MFC000000874	98%
31338	3-Cyanopropyl dimethylchlorosilane	18156-15-5	MFC000001969	90%
31344	Diisopropylchlorosilane	2227-29-4	MFC000054896	95%
31350	Chlorodimethylethylsilane	6917-76-6	MFC000009918	97%
31357	Isopropyl dimethylchlorosilane	3634-56-8	MFC000009917	95%
31393	Chlorotripropylsilane	995-25-5	MFC000000508	98%
35153	Dimethoxydimethylsilane	1112-39-6	MFC000025691	95%
38932	N,O-Bis(trimethylsilyl)trifluoroacetamide BSTFA	25561-30-2	MFC000008269	
42036	Tetraethyl orthosilicate	78-10-4	MFC000009062	98%
43075	Bromotrimethylsilane	2857-97-8	MFC000000048	97%
43085	Hexamethyldisilazane	999-97-3	MFC000008259	99%
43088	Dichlorodimethylsilane	75-78-5	MFC000000491	≥99.5%
43089	Dichlorodiphenylsilane	80-10-4	MFC000000489	≥97%
43092	tert-Butyl(chloro)diphenylsilane	58479-61-1	MFC000000497	98%
43094	(3-Aminopropyl)triethoxysilane	919-30-2	MFC000008207	99%
43219	Decyldimethylchlorosilane	38051-57-9	MFC000054168	97%
43221	(3,3,3-Trifluoropropyl)chlorodimethylsilane	1481-41-0	MFC000053211	95%
43222	Cyclohexylmethylchlorosilane	5578-42-7	MFC000046333	97%
43223	Dodecyldimethylchlorosilane	66604-31-7	MFC000043326	95%
43224	Phenethyltrichlorosilane	940-41-0	MFC000039290	95%
43225	Cyanopropylmethylchlorosilane	1190-16-5	MFC000019889	97%
43226	n-Butyldimethylchlorosilane	1000-50-6	MFC000015727	97+%
43234	Phenyldichlorosilane	1631-84-1	MFC000039296	97%
43236	Diisopropylchlorosilane	7751-38-4	MFC000054895	97%
43264	Methyltrimethoxysilane	1185-55-3	MFC000008342	97%
43289	Ethylmethylchlorosilane	4525-44-4	MFC000013607	97%
43306	Vinyltrimethoxysilane	2768-02-7	MFC000008605	97%
43307	1,1,3,3,5,5-Hexamethyltrisiloxane	1189-93-1	MFC000039788	>95%
43308	Ethyltrimethoxysilane	5314-55-6	MFC000051541	≥97%
43311	tert-Butyldimethylsilyl chloride, 50% solution in toluene	18162-48-6	MFC000000501	
43325	Chlorotriethylsilane solution 1.0 M in tetrahydrofuran	994-30-9	MFC000000507	
43490	Trioctylsilane	18765-09-8	MFC000053812	95%
43560	n-Butyltrichlorosilane	7521-80-4	MFC000013605	99%
43565	Chlorodiethylisopropylsilane	107149-56-4	MFC000191631	97%
43869	(3-Bromopropoxy)-tert-butyldimethylsilane', stabilized over sodium carbonate	89031-84-5	MFC000216589	97%
44028	Triethylsilylbromide	1112-48-7	MFC000000049	95%



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